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Additions to the Peronosporeæ of the United States.

BY W. G. FARLOW.

The following additions should be made to the *Enumeration of the Peronosporeæ* given in the October and November numbers of the GAZETTE for 1883. Since the publication of the *Enumeration* a number of interesting forms have been received from correspondents in the Western States, to whom my thanks are due. The names of the correspondents are given below in connection with the species received from them. The numbers given are those affixed to the species in the *Enumeration*, and additional species are indicated by stars.

1. *P. viticola.*

The form on *Ampelopsis quinquefolia* was also found in September, 1883, at Ithaca, Wis., Prof. Wm. Trelease. It appears from a review in Just, which I have just seen, that Pirrota, in a paper published in Milan, 1880, stated that *P. viticola* occurs on species of *Cissus* and *Ampelopsis* in Italy. I have not seen the original paper of Pirrota, and its contents are only known to me from the review above named.

2. *P. Halstedii.*

Occurs on the following additional hosts: *Eupatorium ageratoides*, Wisconsin, Trelease; *Silphium perfoliatum* and *S. laciniatum*, Iowa, Profs. Bessey and Arthur; *Bidens chrysanthemoides*, Cambridge.

4. *P. Geranii.*

The form on *G. Caroliniauum*, found by Mr. Earle, seems to belong to this species without doubt. Specimens collected in April show a large proportion of the monstrous conidia, others collected later, in May, show a smaller proportion of the large conidia, and in specimens on the same host collected by Mr. C. A. Hart in July the conidia are the same as in the normal form of *P. Geranii*.

9. *P. parasitica.*

Also on *Draba Caroliniana* and *Lepidium intermedium*, Iowa, Arthur.

10. *P. Potentillæ.*

On *P. Norvegica*, Illinois, C. A. Hart.

12*. P. ARENARIÆ (Berk.) DeBary.

Botrytis Arenariæ Berk. Journ. Hort. Soc. Lond. I., 31. Pl. IV.
P. Arenariæ DeBary. Ann. Sci. Nat. 4 Sér. Vol. XX., p. 110, Pl. XIII., f. 8, 9.

Var. MACROSPORA Farlow.

Conidiophores slender, repeatedly dichotomous, divisions flexuous, tips short, subulate, erect. Conidia ovate-elliptic, 13–17μ broad by 18–22μ long, pale violet colored. Oospores 38–48μ in diameter, very thick-walled, exospore deep yellowish brown, marked with prominent papillæ or short ridges.

On leaves of *Silene* sp.? Cobden, Illinois, Earle.

This striking species covers the under surface of the leaves of some caryophyllaceous plant, probably a *Silene*. The species is intermediate between *P. Arenariæ* (Berk.) DeBary and *P. Dianthi* DeBary. The description given above, which was taken from Illinois specimens, shows that while the oospores are larger than those of *P. Arenariæ* and in size approach more nearly those of *P. Dianthi*, yet the markings of the exospores are like those of *P. Arenariæ*. In fact, the oospores are very strikingly marked, and in several respects recall the oospores of *Cystopus candidus*. The conidiophores and conidia resemble those of European specimens of *P. Arenariæ* rather than those of *P. Dianthi*. I should hesitate to call the species new, while admitting that the American form does not conform to the type of either of the European species named, and it is difficult to say whether, in the present case, we have a form of *P. Arenariæ* with large oospores or a form of *P. Dianthi* with prominently marked exospores.

13. *P. Arthuri.*

Also on *Œnothera biennis*, Illinois, Earle.

24. *P. grisea.*

Also on *Veronica arvensis* with oospores, Anna, Illinois, Earle.

26. *P. leptosperma.*

It was stated in the *Enumeration* that this species was first found in this country at Lake Minnetonka. This is an error, as it was found by Prof. Bessey on *Artemisia Ludoviciana* in Iowa, in September, 1882.

29. *P. sordida.*

On *Scrophularia nodosa*, Iowa, Arthur; Illinois, C. A. Hart.

In the specimens examined the conidiophores formed dense dirty patches, sometimes of considerable extent, on the under side of the leaves. In microscopic characters they agree perfectly with No. 99, Fung. Scand. Eriksson. No oospores were found. The description previously given may be emended as follows:

Conidiophores much and irregularly branched, dichotomous above, divisions divergent, tips acute, rigid, erect. Conidia violet-colored, ovate-elliptic, 20–23μ long by 15–19μ broad.

31. *P. Lophanthi.*

Also on *Lophanthus nepetoides*, Illinois, Prof. T. J. Burrill and C. A. Hart.

Since the publication of the *Enumeration* I have received additional specimens of this species on *L. scrophulariæfolius* from Prof. Arthur, in which, as well as in Mr. Hart's specimens, I have found oospores. They are about 22–26.5μ in diameter, considerably smaller than the oogonia, which are from 38–46μ in diameter. The wall of the oospores is thin and delicate, of a pale yellow color, and the exospore is nearly smooth.

31*. P. SCHLEIDENIANA DeBary l. c. p. 118, Pl. XIII., f. 1–3.

P. Schleideni Unger, Bot. Zeit. 1847, p. 315.
P. alliorum Fuckel. Fung. Rhen. 41.

Conidiophores stout, naked below, above rather sparsely and irregularly dichotomous, branches short, tips stout, flexuous, approximate in pairs. Conidia very large, 40–60μ long by 22–35μ, obovate, usually papillate at the apex and attenuated at the base; dark violet colored. Oospores ?

On *Allium Cepa.*

Ithaca, Wisconsin, Trelease. Europe.

A strongly marked species, characterized by its large conidia attenuated at the base and the short, stout, rather irregularly placed branches. According to Prof. Trelease it is abundant in Wisconsin, and does decided harm to the onion crop. The original name given by Unger was *P. Schleideni*, and dates from 1847. The name given by DeBary is *P. Schleideniana* Unger, and is generally adopted by recent writers. The reason for the change in name is unknown to me, but is probably on etymological grounds.

31**. P. GRAMINICOLA (Sacc.) Schroeter.

Protomyces graminicola Sacc. Myc. Ven. No. 496, 1876.
Ustilago? Urbani Magnus, Sitzungsbericht. Prov. Brand. 26 Apr. 1878.
Peronospora Setariæ Pass. Grev. VII. 99, 1879.
P. graminicola (sub-gen. *Sclerospora*) Schroeter, Hedw. VIII. 83, 1879.

Conidiophores solitary, sparingly branched above, main branches short and thick lying close to the axis, ultimate divisions dichotomous, tips short, straight, pointed. Conidia ovate or elliptic, about 20μ long, hyaline. Oospores spherical, 34–42μ in diameter, endospore very thick, exospore proper thin, the oospores enveloped rather closely by the thick lamellated, yellowish-brown oogonium wall.

On leaves of *Setaria viridis.*

La Crosse, Wis., Mr. Pammel. Comm. Trelease. Europe.

This curious species, for which Schroeter has created the subgenus *Sclerospora*, has been found in several European countries, but is at present only known at La Crosse in this country. The oospores of the Wisconsin specimens are precisely like those of European specimens. The description given above was taken from American specimens as far as the oospores are concerned, the

description of the conidia being taken from Schroeter. In the Wisconsin specimens bodies were found on the surface of the leaves which may perhaps have been the conidia, but the material examined was not in sufficiently good condition to enable me to speak with certainty. The oospores are borne superficially on the leaves, and may be seen with the naked eye as dark brown specks. They readily fall from the leaves and collect in the form of a powder in herbarium envelopes. The endospores are very thick sometimes, in American specimens as thick as 4μ, which is thicker than reported European specimens. The exospore of other *Peronosporæ* is here represented by merely a thin film, whose surface is more or less roughened, but the oogonium wall itself, which is very thick and of a dark brown color, serves the purpose of an exospore, and instead of the spore escaping from the oogonium, as is generally the case, the oogonium falls from the leaf with the spore. The antheridia are plainly seen in Wisconsin specimens, even after having been dried for several months.

32. *Cystopus candidus.*

Also on *Nasturtium palustre* near Chicago, Arthur; and on *Sisymbrium canescens* with oospores, Arizona, H. H. Rusby.

33. *C. cubicus.*

On *Artemisia biennis*, Wisconsin, Trelease.

34. *C. Bliti.*

On *Amarantus blitoides*, Iowa, Arthur.

Besides the above, *P. nivea* and *P. Viciæ* are mentioned in a Partial List of the Fungi of Wisconsin, by Dr. W. F. Bundy, in the first volume of the Geology of Wisconsin. The hosts on which these species grew is not mentioned, but Dr. Bundy kindly informs me that *P. Viciæ* grew on cultivated peas in his garden, but he does not recollect the host of *P. nivea*, and unfortunately his specimens and notes on the subject were lost.

A Botanical Holiday in Nova Scotia. III.

BY T. J. W. BURGESS, M. D.

Led by the advertisements to believe that if we reached Port Mulgrave, on the Gut of Canso, in the evening, all we would have to do was to step off the cars on to the steamer for Sydney, we made no effort to catch the morning express, but loitered about Pictou and New Glascow until the afternoon. Our train, an accommodation, certainly deserved the name. Time seemed to be no object, and at every station train-hands and passengers "piled off" to gather wild strawberries, which were very fine and plentiful. Along the track *Senecio aureus*, L. var. *lanceolatus*, Oakes, seemingly the leading form throughout the country, grew

luxuriantly, and in one spot *Amarantus retroflexus*, L. was abundant. After dark the air, woods and grass were ablaze with fireflies, producing a charming and fairy-like effect as we *dashed* (?) along. 9:30 P. M. saw us at Mulgrave Wharf, where we learned to our intense disgust that the steamer only met the express, and then crossed to the opposite side of the Strait to lie at Port Hawkesbury until morning, when she left for Sydney. By the time that we had found out for ourselves that the ferryman lived on the other side also,—so that though our vessel lay only a mile away, she might as well have been twenty,—the little waiting-room had been locked up, and the train had gone back to the village. Imagine our feelings! dumped, with our baggage, in the middle of a pitch-dark night, on a wharf with not a house in sight around it,—the nearest tavern a mile up the track, and no one to give us aid or information. Finally the station operator, the only one of the railway employes who had taken the least trouble to help us in our dilemma, volunteered to show us the way to the hotel, an offer we gladly accepted. Lucky it was we had a guide, or some of the party (for we were not alone in our misery) would in all probability have broken their necks, a long piece of trestle-work forming part of the track about half a mile from the wharf. The hour was late when we reached our destination, but the landlord, Mr. Gillis, a genuine Highlander, and his wife, did all they could to make us comfortable. Though most of the luxuries of modern civilization were wanting, everything was scrupulously clean, and a snack, washed down by a glass of real Scotch whisky, and followed by a pipe, was no bad preparation for a good night's sleep.

A glorious sunshiny morning and a scene to delight an artist's soul completed the cure of our over-night disappointment. The hotel was close to the water flecked with white sails, and being situated on high ground gave a superb view both of the strait and of the western shore of Cape Breton. Within a quarter of a mile was a lovely cove, Pirates' Harbor, one of the places formerly frequented by the famous (or infamous) Captain Kidd, and, like many others, said to be the scene of the burial of his ill-gotten wealth. Breakfast disposed of, we were speedily off for a scramble up a rocky glen at the head of this cove. At what seemed, until right up to it, to be the end of the ravine, the stream we had been following made a sudden bend at right angles, and, turning our eyes, Hartley's Falls in all their picturesqueness were in full view. Tumbling out of a narrow chasm cut in the solid rock, the water, descending in a mass of fleecy foam, was

overhung by perpendicular cliffs, high up on which could be identified tufts of *Aspidium fragrans*, Swz., and *Asplenium Trichomanes*, L. This being the only locality known in the province for these ferns, though their situation presented no very great obstacles to a good climber, we willingly left the far from numerous bunches to gladden the eyes of future botanical explorers. About *Cystopteris bulbifera*, Bernh., also known only here, we were not so diffident, as it clustered abundantly about the base of the same rock. The entrance to the ravine furnished a new station for *Aspidium aculeatum*, Swz. var. *Braunii*, Koch, and further up grew *Viola canina*, L. var. *sylvestris*, Regel, while the wooded plateau above the falls was rich in *Habenaria Hookeri*, Torr. and *obtusata*, Richardson, and *Goodyera repens*, R. Br. and *Monotropa Hypopitys*, L. usurped the densely shaded banks. In the afternoon a walk to the wharf told us that this day's boat had struck a rock on her way up, and would be unable to sail again for some time; but so beautiful were our surroundings, and so rich in mosses our rocky glen, that the tidings were heard without regret. Our enforced stay was fully rewarded by the finding of the rare sea weed *Fucus serratus*, Linn., heretofore only known in America at Pictou, Nova Scotia, and Newburyport, Massachusetts, growing commonly on stones in the harbor; *Zygodon Lapponicus*, B. & S., *Hypnum cupressiforme*, L., *umbratum*, Ehrh., and *brevirostre*, Ehrh., and *Aulacommion turgidum*, Schw. among rocks in the ravine; and *Splachnum rubrum*, L. in a swamp on top of the plateau.

On the third day, successful in catching a steamer, we crossed to Port Hawkesbury, and were at last in the island of Cape Breton, formerly a distinct province, but now a part of Nova Scotia. Morning brought a pleasant sail down the strait to St. Peter's canal, passing through which we entered the famed Bras D'Or. Pen of mine can do no justice to the beauties of this strange ocean lake, which, sheltered from the sea of which it forms a part, divides the island in two, and ramifies through it in a hundred different directions. Bays, inlets, and straits, with islands, peninsulas, and broken coast, were all there, while high above towered the hills and their ancient forests, a mass of verdure. North Sydney, the end of our voyage, lying across the harbor from Sydney proper, is a straggling and dirty, but lively business place, with a people the embodiment of kindness and hospitality. Being a coaling station, many foreign vessels touch there, and a saunter about the streets and docks brought to light a number of introduced plants. *Urtica urens*, L. was everywhere,

and *Lepidium ruderale*, L. and *Senebiera didyma*, Pers. fell little short of it in abundance. *Lamium purpureum*, L., *Fumaria officinalis*, L., and *Myosotis arvensis*, Hoff. were pretty common on ballast and seemed to be firmly established, while *Veronica Buxbaumii*, Tenore, and *Lamium amplexicaule*, L. were more localized, though also well fixed. *Papaver Rhoeas*, L., *Lepidium campestre*, R. Br., *Bellis perennis*, L., and *Achillea Ptarmica*, L. were noted, but very sparsely, and could not be considered as at all permanent. In the middle of a field, at least a mile from any house, was a large patch of *Primula veris*, L. in fine seed, but how it had got there we were unable to learn. A swamp just back of town proved a genuine "bonanza" in more ways than one. The black flies and mosquitoes were terrible,—so much so that from the extravasation of blood, the result of their biting there, my eyes were as black for some days as if I had come out second-best in a free fight. But if it abounded in insects it was also rich in plants, among others being *Aster nemoralis*, Ait., *Gaylussacia dumosa*, T. & G., *Eriophorum alpinum*, L., *Cladium mariscoides*, Torr., *Scirpus caespitosus*, L., *Rhyncospora fusca*, Roem. & Schultes, *Carex utriculata*, Boott, *Lycopodium inundatum*, L. var. *Bigelovii*, Tuck., and *Splachnum ampullaceum*, L. Careful search in a low wood brought to light a few specimens of *Pyrola minor*, L., and where pools had dried up on the sea shore was a form of *Callitriche verna*, L. *Euphrasia officinalis*, L. grew very freely both on the hillsides and in meadows, while boggy spots produced an abundance of *Juncus filiformis*, L. in good fruit.

Thinking it would never do to visit a coal region without inspecting a mine, we betook ourselves to the most extensive, known as the Old Sydney. After seeing all the works above ground, a descent was made of the shaft, seven hundred feet deep, and the subterranean wonders explored Some of the workings have been carried for a long distance under the sea, but I found it quite impossible to realize that the waves of the mighty Atlantic were actually rolling above my head. One of the most interesting sights was the spacious underground stable, where they not only keep, but breed, their stock for use in the mine. I had fancied that the sight of such animals might be defective in some way, but was informed that whenever they had been taken above ground, after a time sufficient to get accustomed to the light, vision seemed quite normal. Not far from the mine was one of the "barrens" peculiar to the country, and this, after jotting down *Gnaphalium sylvaticum*, L., we next pro-

ceeded to examine. "Barrens," or "bake apple barrens,"—as they are called in the neighborhood, from their being the favorite resort of the "bake apple," the name by which *Rubus Chamæmorus*, L. is here known,—are extensive mossy tracts bordered by a growth of scraggy spruce, and covered in places with a low brush of ericaceous plants. They favor the coast, and are said to owe their origin to bush fires which have in times past swept the country. The one visited was particularly rich in the Rubus in all stages, from perfect flower to nearly mature fruit, and also enlarged our collection with *Poterium Canadense*, Benth. & Hook., *Prenanthes serpentaria*, Pursh, var. *nana*, Gr. *Solidago Virga-aurea*, L. var. *humilis*, Gr., *Aster Radula*, Ait., and *Comandra umbellata*, Nutt. The sandy shore below the mine furnished us with *Cakile Americana*, Nutt, and the shallow water of a little lake a few miles from town, with *Lobelia Dortmanna*, L., *Limnanthemum lacunosum*, Griseb., *Sparganium simplex*, Huds. var. *fluitans*, Gr., *Sagittaria heterophylla*, Pursh. and *Isoetes Tuckermani*, *Braun*.

Canada possesses too few historically famous places to sanction the missing of so well-known a one as Louisbourg. Accordingly conveyances were engaged to carry us over the twenty-five miles intervening between that place and Sydney, and a most enjoyable drive was the result, the road, though hilly, being good, pleasantly diversified with hill and dale, and generally shaded. By the way, just after starting was seen *Blitum Bonus-Henricus*, Reich., and in fields a little farther along *Digitalis purpurea*, L. A dwarf state of *Sparganium simplex*, Huds. var. *angustifolium*, Gr. occupied wet places on the higher lands, and *Carex rostrata*, Mx. low swamps between the ranges of hills, while in Black Brook, just where it crossed the road, *Nuphar pumilum*, Smith, was abundant. One of our horses having broken down, our progress was so delayed that we did not reach our journey's end until toward evening, and it was the following morning ere we found ourselves among ruins rich in historical recollections and in floral treasures. Listening to the mournful surges of old ocean,—a fitting requiem,—what a world of thought on the vanity of all things earthly did the prospect open. Twenty-five years of labor and thirty millions of lives had the French expended to make this place one of the strongest fortresses in the world; now it was but a heap of grass-grown ruins. Captured first by the hardy New Englanders under Pepperal, it was restored by the treaty of Aix-la-Chapelle, and again became the strong-hold of France on the Atlantic coast, and a key to the Gulf of St. Law-

rence. War re-opened, Wolfe sought the new world, and Louisbourg fell once more, and forever. A fiat was issued that the place should be destroyed. Buildings were blown up, walls torn down, and the once proud city reduced to a shapeless mass. Two years were needed to complete the work of destruction, and so thoroughly was it done, that to-day but a couple of stone arched casements remain unbroken, though the lines of many of the old fortifications may still be indistinctly traced. On our way along the shore a valuable find was made in *Iris tridentata*, Pursh. flourishing on a bank just above the sea, while some swampy ground skirting an outlying work known as the "Grand Battery," was literally a mass of *Microstylis ophioglossoides*, Nutt. The grass-slope back of the same work was white with the spikes of *Habenaria dilatata*, Gr., and *Lythrum Salicaria*, L. with *Carex paniced*, L. grew plentifully in the ditch surrounding it. *Hippuris vulgaris*, L. almost choked up the old moat encircling the main defenses and *Iris prismatica*, Pursh. enriched a low swale near by. A wet "barren" had added materially to the strength of the place on the seaward side, and in picking our way over this we stumbled across *Carex limosa*, L., *Calamagrostis Pickeringii*, Gr., and *Hypnum molle*, Dicks., while *Racomitrium lanuginosum*, Bird., was found on dry banks closer to the shore.

Retracing our steps to Sydney, and over the Bras D'Or, our next halt was made at Baddeck, with other Cape Breton scenes so well described by Charles Dudley Warner in his sketch "Baddeck and that Sort of Thing." Here, in a salt-water pond on the island forming the harbor were got *Zannichellia palustris*, L. and *Ruppia maritima*, L., and, on the sands surrounding it, a form of *Potentilla Anserina*, L., differing from our inland one in having a widely reflexed calyx and acheniæ forming dark purple heads as large as the ordinary run of wild strawberries. On the swampy shore of the mainland grew *Eleocharis pygmæa*, Torr., and *Poa serotina*, Ehrh., while the grassy hill slopes were gay with *Habenaria lacera*, R. Br., and, where at all shaded, with *Aspidium Noveboracense*, Swz.

Notes on Indiana Plants, 1883.

BY E. J. HILL.

The following notes have been selected from my note-book for 1883 as far as it relates to the flora of Indiana. Some of the species named are additions to those given in the Catalogue of the Plants of Indiana by the editors of the BOTANICAL GA-

ZETTE, and others are mentioned to extend their geographical range beyond that indicated in the same work.

Anemone triloba, Chaix. Michigan City. Found in abundance on the slopes of sand hills, mostly on their eastern sides. All have the lobes of the leaves rounded or very blunt, none with acute lobes being noticed. In the immediate vicinity of Chicago the lobes of the leaves of Hepaticas are all acute, as far as I have met with the species. Mr. Babcock, in his Flora of Chicago and vicinity (*The Lens*, vol. 1, p. 20), mentions the occurrence of *Hepatica triloba* on the hills at Joliet, Ill., and also at Michigan City. At the latter place it grows interspersed with *Epigæa repens*, L.

Hypericum Sarothra, Michx., Hammond, Lake county.

Pycnanthemum linifolium, Pursh., Whiting, Lake county.

Lycopodium lucidulum, Michx., Chesterton, Porter county.

In "Wolf Lake," a narrow pond in the northeastern corner of Lake county, the following Potamogetons were found; *P. amplifolius*, Tuckerman, *P. perfoliatus*, L. var. *lanceolatus*, Robbins.

There may be given for new localities:

Lespedeza reticulata, Pers., var. *angustifolia*, Gray., (*L. violacea*, Pers. var. *angustifolia*, Gray, Man.) Gibson, Lake county.

Floerkea proserpinacoides, Willd. Chesterton.

Gnaphalium uliginosum, L. Along the road between Hammond and Gibson. This is the first time I have seen this plant in the West. It is not given in Patterson's "Catalogue of the Plants of Illinois." I have found it as far north as Sault Ste. Marie, Ontario.

Cacalia atriplicifolia, L. Hammond; *Hieracium Gronovii*, L., sand hills at Hammond.

Gerardia auriculata, Michx., Sheffield, Lake county.

Poa annua, L., Hammond. With biennial root. Not a "frequent" plant or found "everywhere," as far as my experience goes, though often sought.

Potamogeton zosteræfolius, Schum. (*P. compressus*, L. ex Fries, Gray's Manual), *P. lonchites*, Tuckerman, *P. pectinatus*, L., *P. zizii*, Schum. (*P. lucens*, L. var. *minor*. Volte), "Wolf Lake."

Utricularia resupinata, Greene. This, noticed last year in the BOTANICAL GAZETTE, and identified from a single imperfect specimen found in flower late in September, and from some plants in fruit, was sought in August the past summer. Hundreds of plants were seen in blossom, so that there was no mistake as to the identification. As yet I have seen it in no locality except

this "slough" at Whiting. *Utricularia* is well represented in the pine barrens of Lake county, where I have found besides the above, *U. vulgaris*, var. *Americana*, *U. gibba*, *U. purpurea*, and *U. cornuta*. *U. intermedia* has been reported, but I have not found it, except farther north in Michigan.

At Chesterton, in the low grounds by the Calumet river, occur plants of *Viola striata*, Aiton, with white flowers and crenate-serrate leaves, approaching *V. canina*, L. var. *Sylvatica*, Regel, in its leaves. *Lespedeza capitata*, Michx. var. Leaflets linear-lanceolate to oblong-lanceolate, strongly reticulated, glabrous above. Lower peduncles often elongated to $\frac{1}{2}$ to $\frac{3}{4}$ inch; stem slender and but little branched. Approaches in character *L. angustifolia*, Elliott, (*L. capitata*, var. *angustifolia*, Gray), but has also characteristics of *L. capitata*, var. *longifolia*, Torr. & Gray (Flora of N. A., vol. 1, p. 368).

Lespedeza capitata, Michx., var. Leaflets linear-oblong, densely silky canescent on both sides, shining; stem densely villose, not much branched, but more so than in the common form of the above variety. Otherwise it does not seem to be distinct from *L. capitata*, var. *sericea*, Hook & Arnot, in Torr. & Gray's Flora of N. A. (vol. 1, p. 369). The shape of the leaflets is intermediate between the first variety and the common form. The peduncles of the lower flowers are inclined to lengthen, as in *L. angustifolia*, Elliott.

Both of these grow with the common *L. capitata*, on the dry sand ridges near Hammond, a station on the Mich. Cent. R. R. The three in some respects shade off into each other, especially in their lower leaves, and yet they were easily detected in the field before consulting the books for finding the distinctions between them and the well known *L. capitata*, everywhere abundant in this region. Whether the first of these should be called *L. angustifolia*, Elliott, and included with it, or *L. capitata*, var. *longifolia*, Torr. & Gray, is not easy to determine, but the former seems preferable. The range of *L. angustifolia* is given in Gray's Manual as "near the coast and southward;" that of *L. capitata*, var. *longifolia*, "Kentucky to Louisiana;" (Flora of N. A.) The second variety is so near *L. capitata*, var. *sericea*, that little is risked in classing it with that, the main discrepancy consisting in its being less branching. Its range is said to be "Louisiana," *Drummond;* Arkansas, *Nuttall! Dr. Pitcher!*" (Flora of N. A.) It would seem that we have near the head of Lake Michigan the connecting links between *L capitata* and two of

its varieties and *L. angustifolia*, until lately regarded as a variety of *L. capitata* also.

All of these forms were obtained within a few rods, or even feet, of each other, under substantially the same conditions of environment. It is not easy to conjecture what forces should cause such modifications, if they originated here, and the varieties have spread elsewhere to become more modified under different conditions of climate, soil, or other external forces. If they originated elsewhere, and have been brought together here, the same environment might be expected to lessen their differences, and cause them to approach a common type.

GENERAL NOTES.

The Willow Basket.—Mr. Guthrie's story is not without a parallel. See Darlington's *Flora Cestrica*, ed. 3, p. 279, for the following: "In Watson's Annals of Philadelphia we are told that the Yellow Willow, in this State [Pennsylvania] came originally from some wicker-work found sprouting in Dock Creek. It was seen by Dr. Franklin, who took it out and gave the cuttings to Charles Norris, who reared them on the grounds now the site of the Custom House, or late Bank of the United States."

A basket of unpeeled willow, combining much strength with flexibility, is quickly, cheaply and easily made, providing the material is readily accessible. Somewhere along the canal bank the boatman might cut his bundle of green twigs, and a half-hour or less of evening work would give him an excellent thing for carrying his potatoes in the hold. But the weight, which is simply astonishing to persons accustomed to handling ordinary willow ware, would be likely to insure its staying there, and so long as it did stay it would continue to be a very good basket, and would also be in condition to sprout if thrown into a ditch. But a more shackly thing than a willow basket woven green and afterwards dried it would be difficult to imagine! I have seen, with my own eyes, a first rate half-bushel feed basket of unpeeled willow go to complete wreck on a western farm in less than a week—a brief period not at all inconsistent with the retention of vitality in the stouter frame-work. On the other hand I have had too much experience in unsuccessful attempts to revive carelessly packed willow cuttings to place much confidence in the vitality of dried and withered twigs coming to hand after only a few days of transit through the mails.

Please observe I do not question Mr. Guthrie's statement of facts. I simply would state express belief that he very much overestimated the character and extent of the service done by his basket before it landed in the ditch.—M. S. B.

Variation and Environment.—Is variation an indication of changed environment? The red cedars which flank the road-side to my house present

the most dissimilar forms. No two of them are alike. What has environment to do in the case? And persimmons are often seedless in this part of the world, seldom, indeed, having their full complement of seeds. If I examine wild plants closely, I find few which do not vary in some respects from their neighbors of the same species. Either there is some ambiguity about the the terms "variation" and "environment," or Dr. Sturtevant's proposition that "variation is an indication of changed environment," needs revision.—THOMAS MEEHAN.

Notulæ Californicæ.—*Chrysanthemum Leucanthemum*, L. is mentioned in the Botany of California as occurring at Santa Cruz, in fields, and is remarked upon as not likely to become the troublesome weed here which it has so long been in the Atlantic States. Being a perennial, its troublesome spreading is hardly to be feared on lands that are subjected to the plow and harrow every year; and in all the western part of California even the cultivated forage plants are annuals, such as wheat, oats, etc. Meadows of perennials, such as timothy, clover, etc., where the white weed finds time and place to thrive, are here unknown. However, among the middle ranges of the Sierra there are not wanting considerable tracts of perennial meadow, and in this region of the State the white weed may possibly prove troublesome.

In Nevada county, not far from Grass Valley, I noticed in July last, abundance of it. It appeared to grow luxuriantly, not only in the moist meadow lands of the valleys, but was also well established on the dry hillsides, under the partial shade of the scattered pines. It was a surprising thing to behold the veritable ox-eye daisy making itself perfectly at home in the society of the *Eriogonums* and the *Hemizonias*, and blooming with them in the midst of the summer drought.

Convolvulus sepium, L, new to California, has been found by the writer, during the past season, growing in great abundance in the brackish marshes along Suisun Bay, and also in similar situations near the town of Napa. It looks rather unlike the eastern forms, having a narrower and paler foliage, and being slightly pubescent. Its roots are within reach of tide-water in both localities, and its stems, attaining a height of not more than two or three feet, support themselves on the weeds and rushes, among the masses of which it grows. The corollas are very large and deeply tinged with rose.

Typha angustifolia, L., thus far reported only from the south part of the State, is much more abundant in the marshes about Suisun than is the commoner species. Its leaves and stems here often attain the height of ten or twelve feet.—EDW. L. GREENE, Berkeley, California.

The Anomalous Cobæa.—I venture to inquire whether the anomaly of the seedling Cobæa, given on page 12, may not be differently interpreted. May not the notched leaf be formed of the two cotyledons, united and turned to one side, and the pinnate leaf be the leaf of the next node, the internode between nearly undeveloped?—A. GRAY.

Heliotropism in Sun-flowers.—It is well understood, I believe, that the sun-flower does not turn with the sun, and that the poetical associations of the

its varieties and *L. angustifolia*, until lately regarded as a variety of *L. capitata* also.

All of these forms were obtained within a few rods, or even feet, of each other, under substantially the same conditions of environment. It is not easy to conjecture what forces should cause such modifications, if they originated here, and the varieties have spread elsewhere to become more modified under different conditions of climate, soil, or other external forces. If they originated elsewhere, and have been brought together here, the same environment might be expected to lessen their differences, and cause them to approach a common type.

GENERAL NOTES.

The Willow Basket.—Mr. Guthrie's story is not without a parallel. See Darlington's *Flora Cestrica*, ed. 3, p. 279, for the following: "In Watson's Annals of Philadelphia we are told that the Yellow Willow, in this State [Pennsylvania] came originally from some wicker-work found sprouting in Dock Creek. It was seen by Dr. Franklin, who took it out and gave the cuttings to Charles Norris, who reared them on the grounds now the site of the Custom House, or late Bank of the United States."

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ancient stories of the Heliotrope with our *Helianthus*, simply because it looks like the sun, is all there is in it. I have, however, shown, in the *Proceedings of the Academy of Natural Sciences, of Philadelphia*, by an actual observation and count of flowers as they opened, that *Helianthus mollis* has a southeasterly face on opening, and that it turns, not with the sun, but eastwardly as the head progresses towards maturity. These observations were made on a cultivated plant. Going across the continent last summer, I noticed this plant for several days from the car windows. It was then about opening its first heads of flowers, and I kept count of all I could well fix my eyes on. These also, with rare exceptions, faced horizontally to the southeast. The matter is one of some interest, and those who may have opportunities to watch *Helianthi*, as they open from day to day, would be pleased, I think, in making notes.—THOS. MEEHAN.

A Specific for Snake-bite.—While rambling among the mountains of Western North Carolina on a summer jaunt, we were startled to find that the inhabitants of those primitive wilds regarded the bite of one of the deadliest foes to mankind, the rattlesnake, with scarcely more concern than they did the sting of a bee or wasp. Strolling leisurely, gypsy-like, through that fresh, picturesque and beautiful region, we were halted one August morning in front of the toll-keeper's gate, at the entrance of the turnpike road over the grand chain of mountains known as Nantahala. A number of men came out of the house of the toll-taker; one of whom had his arm in a sling, but otherwise seemed in as perfect health and spirits as the most jovial of the group. It was ascertained that he had been bitten by a rattlesnake the day before, and that the remedy he had used was the chewing of the root of what he termed "Red Joint," or "Four Leaf." Taking a bit out of his vest pocket, he remarked, "With this, the rattlesnake's master, about me, I wouldn't mind being snake-bit every week." Curious to see the plant possessed of such wonderful virtues, for it was declared to be a positive antidote for the poison of any serpent or insect, we engaged him to accompany us until he could show us a specimen. Upon analysis it proved to be *Silene stellata*, the localisms of "red joint" and "four leaf" being readily explained by the red nodes at the junction of leaf and stem, and in the four-leaved verticels. We sometimes found a kindred species, the Fire Pink, *S. Virginica*, in its near neighborhood, whose cymes of crimson flame contrasted brilliantly with the panicles of delicate, white, fimbriate blossoms of the former.

The *S. stellata* seemed generally to seek cool, sheltered situations, yet not infrequently it was seen in company with its glowing sister, fire pink, on the high slopes of the mountains, their slender stems stirring with every light breeze, and gracefully nodding to ferns and flowers which flourished luxuriantly in the glens below. At Aquone, near the debouchment of Laurel creek into the Nantahala river, the banks of both streams being thickly set with Hemlock, Rhododendron, Azalea, Laurus, and *Kalmia latifolia*, the *S. stellata* grew in the damp, shady nooks beneath their branches, in rich profusion, and with finer fuller panicles than I had observed elsewhere. The *S. Virginica* is of somewhat

common growth in the mountainous districts of Upper Georgia, but I do not remember to have seen the *S. stellata* except in the North Carolina mountains.

Had Dr. Darwin known of the extraordinary curative properties ascribed to the plant, he would not, perhaps, have written of

"The *fell* Silene and her sister fair,"

or, as "Skilled in destruction."

I will mention that there was very little viscidity about the species under consideration, not enough, I think, to entrap the feeblest insect. Quite the contrary, however, with the *S. Virginica*.—ELIZABETH L. H. WILLIS, *Charleston, S. C.*

The Genus Podophyllum.—This little genus is rapidly coming to the front in botanical interest and leaving far behind the idea that it is monotypical. Upon the very heels of the discovery of the Formosan *P. pleianthum* comes another new species from S. E. China. Dr. Hance, who describes it in the *Journal of Botany* for December, says that it agrees with "its insular ally in the color, number, and atrocious odor of its flowers, but differs in their extra-axillary position, just as the Himalayan *P. Emodi* disagrees with *P. peltatum*." The inflorescence of the four species now known would form an interesting morphological study. In *P. peltatum* and *P. pleianthum* the leaf stalks can easily be called petioles, but in the two other species the prolongation above the leaf indicates a stem, or rather a branch from the rhizome. In the new plant, which is called *P. versipelle*, the leaves vary in outline from a square, parallelogram, triangle or pentagon, to a circle, and are either with or without lobes. Dr. Hance gives the following arrangement of the species:

I. *Diplostemon*.—Stamens twice as many as the petals. Flowers white, solitary, terminal between opposite leaves. American.—*P. peltatum*.

II. *Isostemona*.—Stamens of the same number as the petals. Asiatic.

Flowers white, solitary, extra-axillary.—*P. Emodi*.

Flowers purplish, aggregated.

Flowers between opposite terminal leaves.—*P. pleianthum*.

Flowers extra-axillary.—*P. versipelle*.

EDITORIAL NOTES.

A NEW MANUAL of the flowering plants of the Northern United States is in course of preparation by Prof. W. A. Kellerman, of the Kansas Agricultural College.

W. N. SUKSDORF's third fascicle of Washington Territory plants is very attractive, and the price for sets or desiderata is so reasonable that many botanists will doubtless take this opportunity to fill up some gaps.

IN VOL. IV, of the Proc. Dav. Acad., Dr. C. C. Parry describes four new plants from Southern and Lower California. They are *Phacelia suffrutescens*, *Ptelea aptera*, the specific name referring to the wingless fruit, *Polygala Fishiæ*, and *Gilia Orcuttii*.

ALL OUR HERBARIA contain specimens from Mr. A. H. Curtiss, and we do not need to call attention to their value as species, nor their completeness of preparation. The successive fascicles, now numbering seven, have each brought many accessions eagerly sought for by botanists. This season Mr. Curtiss will collect such plants of North Florida as are ordered, and will send lists to purchasers for selection. He can be addressed at Jacksonville, Florida.

BREFELD DEVOTES the fifth part of his *Botanische Untersuchungen* to the development of the *Ustilagineæ*. By using nutritive fluids for his cultures he was enabled to obtain far more important results than those of other observers. By this means he found that the sporidia produced by the germinating spores have the behavior of conidia, and that the so-called conjugation in *Tilletia*, which is without sexual significance, does not occur when nutriment is abundant.

AS WE GO to press the death of Dr. Geo. Engelmann is announced, and to western botanists especially it comes like the shock of a family bereavement. So great and so kind, was the general thought in regard to him, and we hope soon to be able to give to our readers a suitable memorial notice.

PROF. EDWARD S. BURGESS, of the Washington High School, has published a "Syllabus of the Courses in Botany and Zoology," which rather surprises one accustomed to the ordinary High School biology. Of course the means of illustration in Washington are unusually good, thanks to the Botanical Gardens and National Museum. But the main point is, that use seems to be made of the materials within reach, which would work a revolution in probably nine-tenths of our schools. But the Botanic Gardens and National Museum are by no means the only things Prof. Burgess uses, but he depends largely upon what every teacher has, the inexhaustible Botanic Garden and Museum of Nature herself. One only needs Nature to teach pupils much natural science, but the trouble is that much of our school natural science is so very unnatural.

CURRENT LITERATURE.

Arctostaphylos, Adams. Notes on the U. S. Pacific Coast species, from recent observations of living plants, including a new species from Lower California. By C. C. Parry. From proceedings Davenport Acad. Science, vol. iv.

Some twenty-five species of *Arctostaphylos* are recognized by botanists, thirteen of which are found within the limits of this paper. The only one of general distribution is the well-known *A. Uva-ursi*. Five species are exclusively Californian, three of which Dr. Parry characterizes as doubtful, or imperfectly understood. Seven other species extend into Mexico, including the new species *A. oppositifolia*. This species, together with *A. nummularia*, Gray, are placed in a new section, *Micrococcus*, characterized by the fruit with thin pericarp, without mealy pulp, wrinkled at maturity, and the four or five nutlets easily separating. *A. oppositifolia* differs from all other members of the genus in its opposite or ternately-whorled leaves, and is noted for its two-celled nutlets.